

INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP2004/003727

A. CLASSIFICATION OF SUBJECT MATTER
 IPC 7 F02M21/02 F02M51/06 F02M61/18

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
 IPC 7 F02M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 924 674 A (FUCHS HEINZ ET AL) 20 July 1999 (1999-07-20) abstract column 4, line 8 - column 4, line 17; figure 1	1-15
X	EP 0 026 060 A (LUCAS IND PLC) 1 April 1981 (1981-04-01) page 4, line 18 - page 4, line 23; figure 1	1-15
X	PATENT ABSTRACTS OF JAPAN vol. 013, no. 593 (M-914), 27 December 1989 (1989-12-27) & JP 01 249960 A (JAPAN ELECTRON CONTROL SYST CO LTD), 5 October 1989 (1989-10-05) abstract	1-15

 Further documents are listed in the continuation of box C. Patent family members are listed in annex.

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

- *&* document member of the same patent family

Date of the actual completion of the international search

12 November 2004

Date of mailing of the international search report

24. 11. 2004

Name and mailing address of the ISA
 European Patent Office, P.B. 5818 Patentlaan 2
 NL - 2280 HV Rijswijk
 Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
 Fax: (+31-70) 340-3016

Authorized officer

Jackson, S

INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP2004/003727

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 88/04727 A (LUCAS IND PLC) 30 June 1988 (1988-06-30) page 5, line 4 - page 5, line 10; figure 2 -----	1-15
X	WO 99/18345 A (CAMPBELL BILL ROSS ;GAS INJECTION TECHNOLOGIES PTY (AU)) 15 April 1999 (1999-04-15) abstract; figure 1 -----	1-15
X	EP 1 231 378 A (DELPHI TECH INC) 14 August 2002 (2002-08-14) column 3, line 48 - column 3, line 49; figure 1 -----	1-15
X	GB 2 178 483 A (LUCAS IND PLC) 11 February 1987 (1987-02-11) page 1, line 84 - page 1, line 86; figures 2,3 -----	1-15
X	US 4 156 506 A (LOCKE ALAN W ET AL) 29 May 1979 (1979-05-29) column 3, line 18 - column 3, line 20; figure 6 -----	1-15
X	EP 0 491 404 A (JAPAN ELECTRONIC CONTROL SYST) 24 June 1992 (1992-06-24) figure 2 -----	1-15
X	EP 1 114 929 A (RENAULT) 11 July 2001 (2001-07-11) figure 1 -----	1-15
X	US 6 311 901 B1 (HALL BRYAN ET AL) 6 November 2001 (2001-11-06) figure 5 -----	16-20
X	US 5 685 485 A (KAPPEL ANDREAS ET AL) 11 November 1997 (1997-11-11) column 3, line 65 - column 4, line 4; figure 2 -----	16-20
X	US 2002/074431 A1 (REN WEI-MIN ET AL) 20 June 2002 (2002-06-20) page 3, paragraph 28; figure 2 -----	16-20
P, X	EP 1 398 497 A (DENSO CORP) 17 March 2004 (2004-03-17) figures 2,5 -----	16-20
X	US 6 422 198 B1 (FOURNIER STEPHANE ET AL) 23 July 2002 (2002-07-23) column 7, line 13 - column 7, line 15; figures 3,7 -----	16-20
		-/-

INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP2004/003727

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2002/030124 A1 (IMOEL WILLIAM JAMES) 14 March 2002 (2002-03-14) page 3, paragraphs 34,36,40; figure 5 -----	16-20
P,X	EP 1 375 903 A (SIEMENS VDO AUTOMOTIVE CORP) 2 January 2004 (2004-01-02) figures 2a,2b -----	16,17, 19,20

INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP2004/003727

Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:

3. Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:

4. No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

The additional search fees were accompanied by the applicant's protest.

No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/MSA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-15

Claims 1-15 define special technical features relating to a discoidal valve member controlling the flow of gaseous fuel from a fuel injector in an internal combustion engine.

2. claims: 16-20

Claims 16-20 define special technical features relating to the injection orifice size and shape of a fuel injector of gaseous fuel for an internal combustion engine.

Although claims 16-20 are dependent on claim 1, claim 1 is not new, and therefore the application lacks unity *a posteriori*.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP2004/003727

Patent document cited in search report		Publication date		Patent family member(s)		Publication date
US 5924674	A	20-07-1999	DE BR CN WO DE EP JP US	19523915 A1 9606453 A 1157030 A , B 9702433 A1 59610001 D1 0778924 A1 10505403 T 6131880 A		02-01-1997 23-12-1997 13-08-1997 23-01-1997 30-01-2003 18-06-1997 26-05-1998 17-10-2000
EP 0026060	A	01-04-1981	EP JP	0026060 A1 56064149 A		01-04-1981 01-06-1981
JP 01249960	A	05-10-1989	JP	2584276 B2		26-02-1997
WO 8804727	A	30-06-1988	EP WO JP	0294406 A1 8804727 A1 1501646 T		14-12-1988 30-06-1988 08-06-1989
WO 9918345	A	15-04-1999	AU AU WO CA EP	749457 B2 9424498 A 9918345 A1 2305244 A1 1021652 A1		27-06-2002 27-04-1999 15-04-1999 15-04-1999 26-07-2000
EP 1231378	A	14-08-2002	US EP	2003111559 A1 1231378 A2		19-06-2003 14-08-2002
GB 2178483	A	11-02-1987	NONE			
US 4156506	A	29-05-1979	GB DE ES FR IT JP	1599525 A 2812739 A1 468271 A1 2384956 A1 1093613 B 53120017 A		07-10-1981 28-09-1978 16-09-1979 20-10-1978 19-07-1985 20-10-1978
EP 0491404	A	24-06-1992	JP JP EP US	2518031 Y2 4089853 U 0491404 A1 5178332 A		20-11-1996 05-08-1992 24-06-1992 12-01-1993
EP 1114929	A	11-07-2001	FR EP	2803362 A1 1114929 A1		06-07-2001 11-07-2001
US 6311901	B1	06-11-2001	AU EP EP EP EP JP WO WO WO WO US US US	4665000 A 1175558 A1 1175559 A1 1175560 A1 1173672 A1 2002543330 T 0065225 A1 0065226 A1 0065227 A1 0065228 A1 6334434 B1 2002050536 A1 2002030124 A1		10-11-2000 30-01-2002 30-01-2002 30-01-2002 23-01-2002 17-12-2002 02-11-2000 02-11-2000 02-11-2000 02-11-2000 01-01-2002 02-05-2002 14-03-2002

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP2004/003727

Patent document cited in search report		Publication date		Patent family member(s)		Publication date
US 5685485	A	11-11-1997	DE	4409848 A1		19-10-1995
			DE	59505999 D1		01-07-1999
			EP	0681873 A1		15-11-1995
			JP	7256155 A		09-10-1995
US 2002074431	A1	20-06-2002		NONE		
EP 1398497	A	17-03-2004	JP	2004060519 A		26-02-2004
			JP	2004060521 A		26-02-2004
			JP	2004068788 A		04-03-2004
			EP	1398497 A2		17-03-2004
			US	2004069873 A1		15-04-2004
US 6422198	B1	23-07-2002		NONE		
US 2002030124	A1	14-03-2002	US	2002050536 A1		02-05-2002
			AU	4665000 A		10-11-2000
			EP	1175558 A1		30-01-2002
			EP	1175559 A1		30-01-2002
			EP	1175560 A1		30-01-2002
			EP	1173672 A1		23-01-2002
			JP	2002543330 T		17-12-2002
			WO	0065225 A1		02-11-2000
			WO	0065226 A1		02-11-2000
			WO	0065227 A1		02-11-2000
			WO	0065228 A1		02-11-2000
			US	6334434 B1		01-01-2002
			US	6311901 B1		06-11-2001
EP 1375903	A	02-01-2004	US	2004000603 A1		01-01-2004
			EP	1375903 A2		02-01-2004
			JP	2004156583 A		03-06-2004